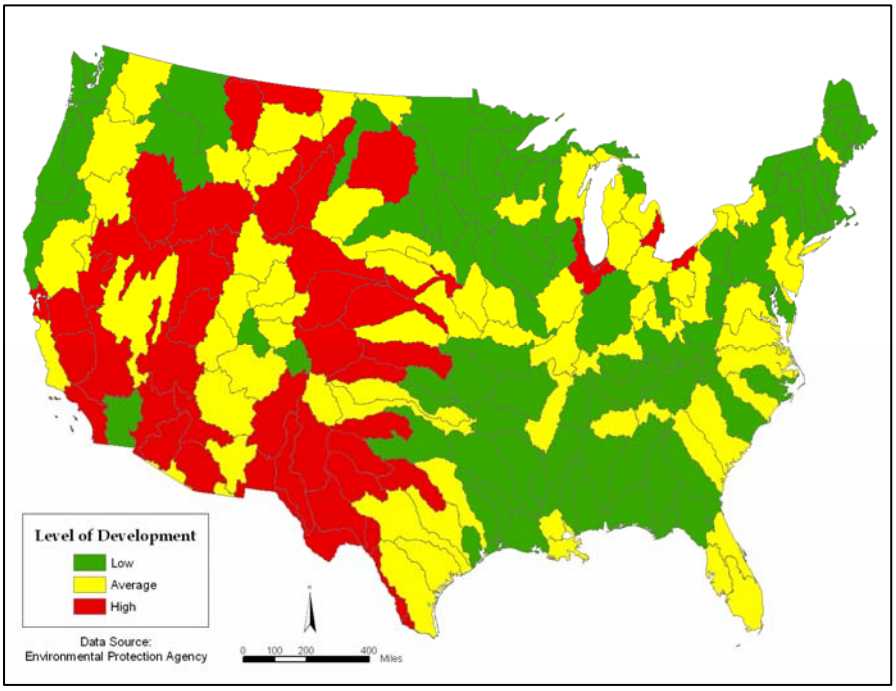
# SIRRA
## Sustainable Installations Regional Resource Assessment

**ERDC/CERL TN-03-3** **rev. April 2005**

## Background

One of the key concerns for Department of Defense (DOD) installations is their ability to sustain, and sometimes change or expand their mission activities. Optimal use of installations in the face of changing missions, new units, ranges, and other facilities, closures, and realignments, requires an understanding of each installation's capabilities. Regional competition for land, transportation, energy, water, and other resources may put an installation's ability to perform essential activities at risk, either at present or in the future, based on regional resource conditions and trends.

**Ratio of water withdrawal to mean annual unregulated**

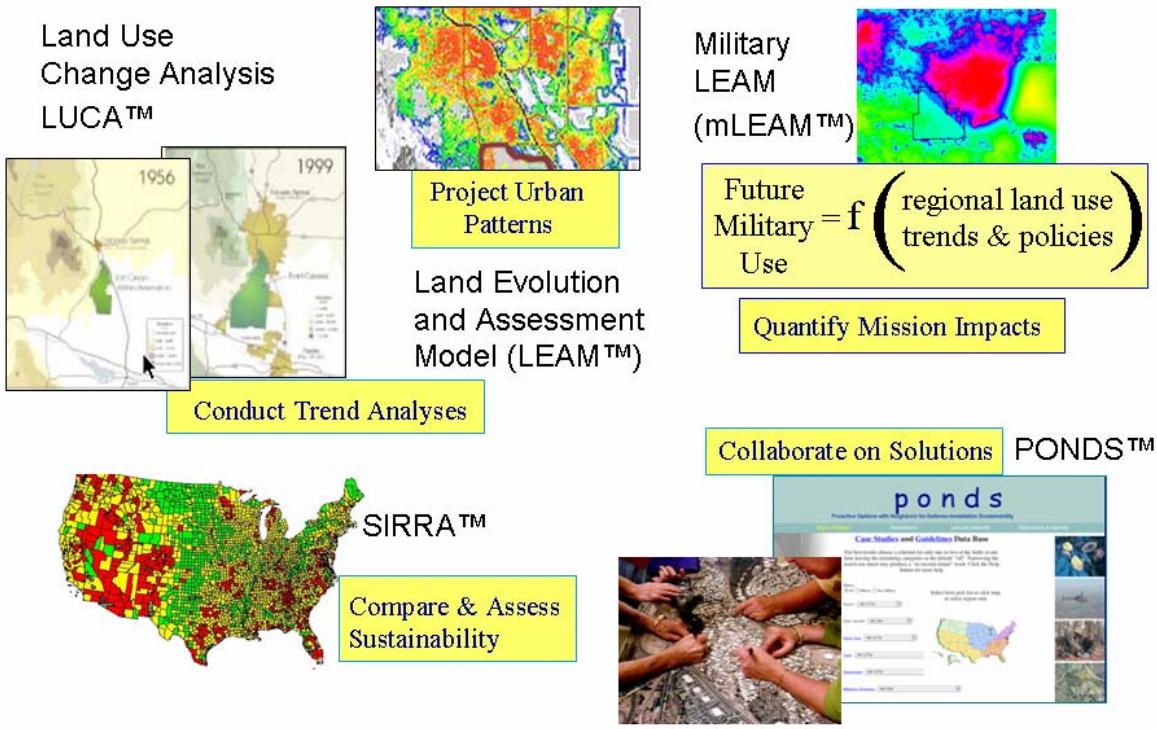



The Sustainable Installations Regional Resource Assessment (SIRRA™) helps identify relative vulnerability in nine sustainability issue areas: (1) air, (2) energy, (3) urban development, (4) threatened and endangered species (TES), (5) locational issues, (6) water, (7) economic issues, (8) quality of life, and (9) infrastructure. Indicators are measurable aspects of a system that can be used to quantify the state or condition of that system. An effective regional indicator provides information about the impact of the surrounding region on the installation's ability to train and maintain its mission.

Military installations provide many benefits to their local region in terms of economic impact and natural resources. They provide large payrolls that boost local economies, and often provide protection of TES habitat. Installations can often find themselves in competition for scarce regional resources, such as land for growth, water supply, air space, and frequency bandwidth. Installation, local, and regional planners must make decisions collaboratively to avoid or mitigate long-term mission constraints. The SIRRA™ tool can inform planning and decisionmaking at the national scale to maximize installation sustainability.

## Changing Regions

Over the past several decades, the population and amount of developed land around most U.S. cities and military installations have grown significantly. Meanwhile, military ranges and training lands have remained undeveloped and have become "islands of biodiversity" as population centers expanded up to or near installation boundaries, and as residential development grew into more remote and previously rural areas. Economic expansion, some probably driven by the installation's economic impact in the local area, spurs development of new suburban communities near DOD installations. Many installations are now impacted by urbanized or urbanizing areas.




The combination of environmental laws and nearby urban development has created significant pressures to alter operations on military installations, and for the military to identify, predict and, in some cases mitigate the "off site" effects of military operations. The term "encroachment" is sometimes used as a general descriptor for the many issues that constrain the military use of land, air, and sea space. Encroachment issues become stressors to sustaining current and/or potential future military operations.

## Description of SIRRA

SIRRA™ provides a screening level capability for characterizing regions surrounding installations based on a set of risks or stressors. SIRRA™ draws data from open, well documented, national level sources, such as the U.S. Geological Survey, Bureau of Census, NatureServe, and U.S. Environmental Protection Agency (USEPA). The sustainability ratings are used to express the relative ranking of these regions using single measures, or groups of measures, that define a stress. This approach allows the use of national-level data to evaluate regional aspects of the installation setting. This evaluation provides a heightened awareness of long-term issues that could threaten mission sustainment.

The SIRRA™ capability uses existing science and measurement-based national data sources. Often, these sustainability ratings mark a snapshot in time, although some data sets are available over multiple periods, and generally all the data sources are updated regularly by their source organizations (e.g., the USEPA updates criteria pollutant non-attainment data annually). This data is organized and analyzed, and used to create national GIS coverages.

Sustainability ratings were developed in several different ways. National regulatory targets exist for some indicators. Examples include the USEPA's six criteria air pollutants that comprise the air quality indicator, the U.S. Fish and Wildlife Agency's species at risk designation, and Federal Emergency Management Agency (FEMA) designated seismic zones. Other data sources require statistical manipulation and evaluation based on the research literature. Quality of life indicators are examples of these.

| SIRRA Matrix | |
|---|---|
| **Issue** | **Indicators** |
| ***Air Sustainability*** | Criteria Pollutant Non-Attainment<br>Sensitivity |
| ***Energy Sustainability*** | Electrical Grid Congestion<br>Electrical Reserve Margin<br>Renewable Energy - Wind<br>Renewable Energy - Solar<br>Renewable Energy - Biomass<br>Electrical Price Structure (Dereg) |
| ***Urban Development*** | Regional Population Density<br>Increasing Regional Growth Rate<br>Regional Population Growth<br>Regional Land Urbanization<br>State Smart Growth Plans<br>Joint Land Use Study (JLUS) |
| ***Threatened and Endangered Species (TES) Sustainability*** | Number of TES in State<br>Species at Risk<br>Federally Listed TES by Ecoregion<br>TES of Concern<br>Biological Opinions |
| ***Locational Sustainability*** | Federally Declared Floods<br>Flood Damage<br>Seismic Zones<br>Weather-Related Damage<br>Federally Declared Disasters<br>Tornadoes |
| ***Water Sustainability*** | Level of Development<br>Ground Water Depletion<br>Flood Risk<br>Low Flow Sensitivity<br>Water Quality |
| ***Economic Sustainability*** | DoD Local Employment<br>Job Availability/Unemployment<br>Housing Affordability<br>Poverty |
| ***Quality of Life (QOL) Sustainability*** | Crime Rate<br>Housing Availability<br>Rental Availability<br>Healthcare Availability<br>Educational Attainment<br>Commute Time |
| ***Infrastructure Sustainability*** | Capacity of Commercial Airports<br>Airport Suitability-C5<br>Airport Suitability-C141<br>Railroad Capacity<br>Proximity to Interstate<br>Roadway Congestion<br>Traffic Volume |
| ***Security*** | Net Metering<br>Proximity to MSA |

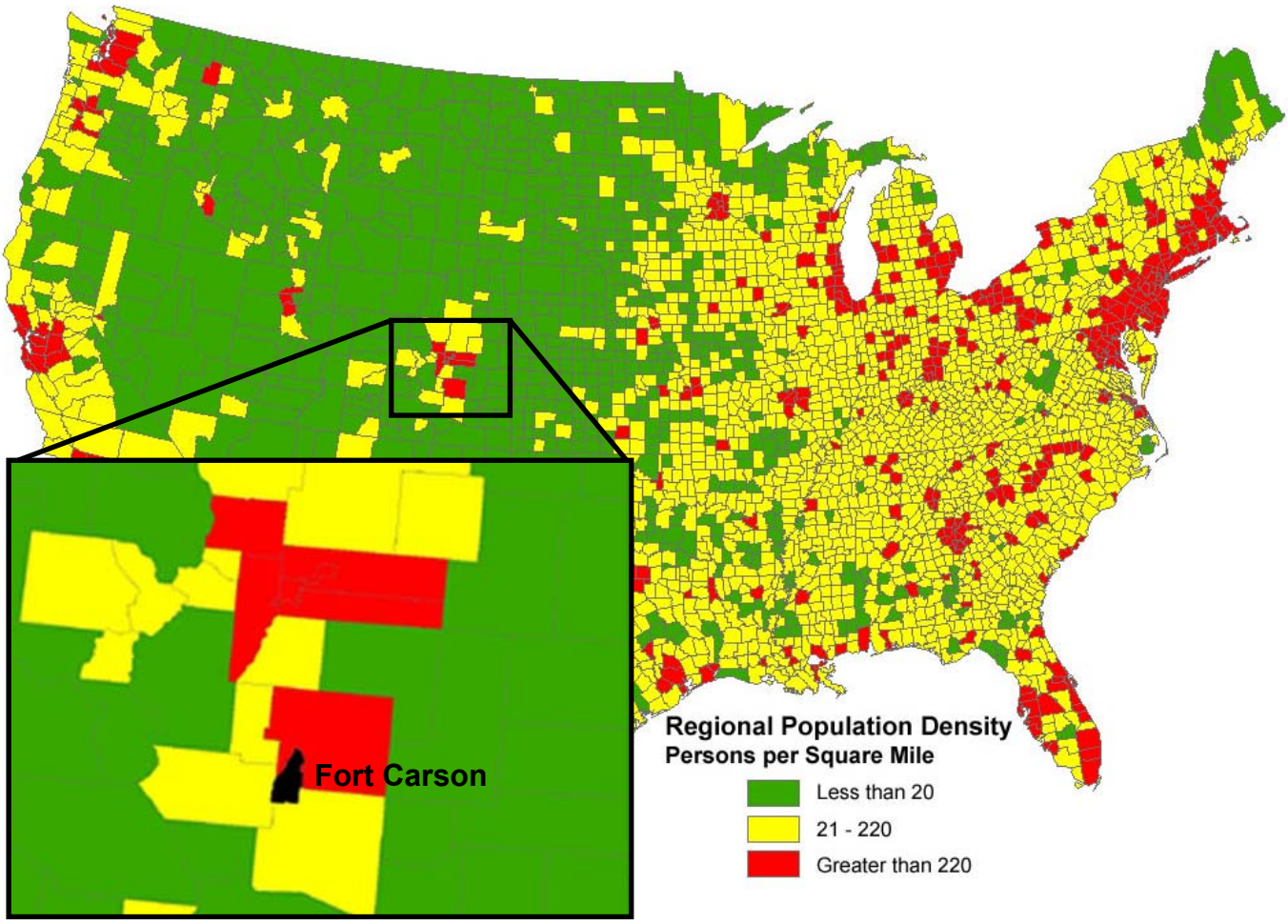
Numeric ratings, reasoning, and actual data are also available for each rating. The SIRRA™ web-based analysis tool allows users to select scaled rating schemas (e.g., such as red/amber/green depiction of high/medium/low sustainability vulnerability), or to view the actual data tables.

## Applications

There are multiple applications for SIRRA™ including support for installation sustainability planning, National Environmental Policy Act (NEPA) analysis, regional planning, stationing changes, force transformation, and base realignment and closure decisions. SIRRA™ is associated with the Fort Future™ initiative, a technology suite designed to help installations and units plan for future requirements. SIRRA™ is on an open and accessible web site – no logins or passwords are required. Please visit SIRRA™ at URL: **https://ff.cecer.army.mil/ff/sirra.do**

SIRRA™ is one of the capabilities that has been developed as part of the Sustainability Encroachment and Room to Maneuver (SERM) research program. Ongoing work on SIRRA™ includes developing the ability to conduct sustainability analyses on the watershed level, a sustainability analysis for 308 DOD installations by service and mission type, and a study of regional sustainability that uses SIRRA™ to correlate indicators to land use changes to predict the impact of alternative future scenarios.

Resources for the development of SIRRA™ have been provided by the Strategic Environmental Resources and Development Program (SERDP), the Army's Fort Future™ research program, the Army Environmental Policy Institute, and the Total Army Basing Study. The SIRRA™ website allows users to search and display sustainability ratings in many different ways, anywhere in the United States. ERDC-CERL team members are available to create custom SIRRA™ analysis reports at a minimal cost.




DoD EPA DOE SERDP
Strategic Environmental Research and Development Program

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